Communications Networks Systems

E1 TRANSMISSION ANALYZER XG2125

This E1 service tester is a multi-functional digital transmission system test device, designed for the installation test, engineering check and acceptance, daily maintenance of the E1 PCM line (G.703 2Mbit/s), mainly performing channel test, alarm analysis, fault finding and signaling analysis of the E1 (2Mb/s) line. This instrument mainly has following functions:

Basic Functions

- Support interface test of unbalanced 75Ω and balanced 120Ω.
- Support HDB3 and AMI line coding.
- Framed test under TX/RX mode (Out-of-service test).
  - √ Framed/unframed end-to-end 2Mb/s BER testing.
  - √ N×64Kb/s BER testing.
  - √ Can monitor signal loss , AIS, frame loss, remote alarm, remote multiframe alarm, CRC multiframe loss, CAS multiframe loss, pattern loss alarm and bit, CODE, FAS, E-BIT error and so on.
  - √ Clock slip measurement.
- Online BER monitoring and timeslot analysis under RX HI-Z (high impedance) and through (bridge) mode.
  - √ Performance test of bit error, coding error, FAS error, CRC4 error and E bit error.
  - √ FAS and MFAS word analysis, timeslot busy or idle status display.
  - √ Timeslot content monitoring, monitoring and display of 8-bit digital code word in any selected timeslot.
  - √ Any 64kb/s tone channel monitoring.
  - √ CAS (channel associated signaling) ABCD code monitoring and CCS (common channel signaling) TS16 timeslot monitoring.
- Framed/unframed Round Trip Delay measurement.
- 2M or 64kb/s signal of SDH transmission network automatic protection switching (APS) delay measurement.
- PCM simulation mode:
  - √ Simulate PCM terminal to perform various error insertion and alarm insertion.
  - √ Transmit editable Si, Sa, A, FAS, CRC-4, MFAS, NMFAS and E- bit.
  - √ Insert idle codes into one or more timeslots, and the idle code pattern is programmable.
  - √ Insert single audio signals whose signal frequency and voltage are adjustable in one or more timeslots.
  - √ Monitor any voice channel in the receiving terminal, single audio channel can measure signal voltage and frequency at the same time.
  - √ CAS (channel associated signaling) ABCD code programming, CCS (common channel signaling) TS16 content programmable;
- 2M signal level, frequency, offset measurement.
- Transmission clock maximum deviation ±999ppm, effectively assess the clock restoration capability of the tested circuit.
- Transmission clock: internal, interface, external 2M clock/signal (optional).
- Test code type pattern: pseudorandom binary sequence (PRBS), fixed code and 16BIT user programmable code.
- Bit, rate and other types of error insertion modes.
- Real time display open circuit and short circuit status of the transmission circuit, effectively identify cable fault.
- Has automatic test function at fixed time.
- Perform the error analysis according to the G.821, G.826 and M.2100 standard of ITU-T.
- Use the TestManager software for measurement result analysis, clean up, archiving and print output on PC via the serial port;

Main Features

- Handheld structure, durable design, suitable for carrying around and on-spot measurements.
- High resolution backlight LCD, smart navigation mode operation displays in English.
- Combine BERT, time-slot analysis, signalling testing, signal analysis, and other functions together.
- Synchronization performance measurements give references to the more and more important system synchronization problem.
- Up to 99 days continuance test performance.
- High storages capacity, can store 4 groups of test results including settings and results information.
- Built-in NiMH rechargeable batteries and embedded with smart fast charger circuit. Can be charged with automobile cigarette lighter battery adapter.
- Real-time clock and storages could be kept during a long time by power supply of the second spare battery without AC adapter and built-in NiMH battery module.
- By using TestManager software, upgrading the embedded software of the instruments via the serial port to perfect the functionalities of the instrument and protect your investment.

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Standard Configuration

Hardware	Qty.	Software	Qty.
XG2120 E1 Service Tester	1	Embedded Software	1
AC Power Adapter	1	TestManager Setup CD	1
Automobile Cigarette Lighter Battery Adapter Cable	1	**Others**	
75OHM Unbalanced Test Cable	2	Waterproof Package	1
120 OHM balanced Test Cable	1	User's Manual	1
RS232 Communication Cable	1	Maintenance Card	1
AA NiMH Rechargeable Batteries	5	Quality Certificate Card	1
		Packing List	1

Options

- G.703 CO Datacom Interface Testing
- Level Measurement

Specifications

Item	Description
internal Clock	2048Kb/s ± 10ppm
Tx Frequency deviation	±999ppm
Rx Rate	2048Kb/s±999ppm
Interfaces	75ohm, Unbalanced, 120ohm, balanced; High Input Impedance >2KΩ
Line Code	HDB3,AMI
Frame Structure	Unframed , PCM30, PCM30CRC, PCM31, PCM31CRC
Input Sensitivity	0~-43dB
Rx Frequency offset	Accuracy: ±1Hz, range: -999ppm～+999ppm
Transmission clock source	Generated from inside, interface extract, external 2M clock/ signal (optional)
Insert Audio Signal	Frequency range: 200Hz～3400Hz Voltage range: -60.00dB～+3.14dB
Single Audio Signal Test	Receiving frequency range: 200Hz～3400Hz Measurement frequency accuracy: ±1Hz Receiving voltage range: -60.00dB～+3.14dB Measurement voltage accuracy: -60.00dB～-21.00dB range: ±2.87dB -20.00dB～+3.14dB range: ±0.21dB

"E1" Specifications

General

Measuring interface 2048Kb/s

Alarm LEDs Signal Loss, AIS, Frame Loss, MFrame Loss (CAS and CRC)
Remote Alarm (RDI and Remote MF), Pattern Loss
Errors, Clock Slip

E1 standards
- Comply with G.703, G.706, G.732
- PCM30: G.704 with CAS multiframe
- PCM31: G.704 with no multiframe
- PCM30CRC: G.704 with CAS and CRC4 multiframe
- PCM31CRC: G.704 with CRC4 multiframe

Test Pattern
- PRBS: 2^{23}-1(O.151), 2^{15}-1(O.151), 2^{11}-1(O.153), 2^{9}-1
- Fixed Code: 1111, 0000, 1010
- 16BIT: Fully programmable 16-bit word
- PRBS Polarity: "Normal" or "Inverted"

Test Period Manual, Auto, Timer

Result Analysis G.821, G.826, M.2100 Analysis

Transmitter

Line Code HDB3, AMI

Impedance 75Ω unbalanced, 120Ω balanced

Pulse Shape Conforms to ITU-T G.703 Table 6

Jitter Meets ITU-T G.823 Section 2

Tx Clock Source Internal, Interface, External source

Internal Tx Clock
- Frequency: 2.048 MHz
- Stability: ±10 ppm temperature 0~40℃
- Ageing: ±2 ppm per year (typical)
- Deviation: ±999 ppm

External Tx Clock 2.048 MHz ± 200 ppm binary clock or 2 Mbit/s HDB3 signal

Error Add BIT, CODE, FAS, CRC4, E-BIT

Error Add Rate Single, 1E-N, N=2~7

Receiver

Rate 2.048 Mbit/s ± 999 ppm (G.703 specs ±50 ppm)

Line Code HDB3, AMI

Pulse Shape Conforms to ITU-T G.703 Table 6

Jitter Tolerance Meets ITU-T G.823 Section 3

Impedance
- "TX/RX": 75Ω unbalanced, 120Ω balanced
- "RX HI-Z": >2KΩ unbalanced, balanced
- "Through": 75Ω unbalanced, 120Ω balanced

Receive Sensitivity > -43dB

External Clock Input
- Binary Clock Input: 2.048 MHz, Square ware, TTL
- 2M bit/s Signal Input: HDB3, 75Ω unbalanced

VF Tone Measurement

- Frequency Measurement: 200Hz ～ 3400Hz
- Frequency Accuracy: ± 1Hz
- Level Measurement: -60 dB ～ +3.14 dB
- Level Accuracy: -60 dB ～ -21 dB: ± 2.87 dB
  -20 dB ～+3.14 dB: ±0.21 dB

Delay Measurement Accuracy: ± 1 μs

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"Datacom" Specifications (Option)

General

Measuring interface:	V.24, V.35, V.36, X.21, RS-449, RS-485, EIA-530, EIA-530A
Terminal Emulation	DTE or DCE
Test Pattern	PRBS: 2^{20}-1(O.153), 2^{15}-1(O.151), 2^{11}-1(O.153), 2^{9}-1(O.153), 2^{6}-1 Fixed Code: 1111, 0000, 1010 16BIT: Fully programmable 16-bit word PRBS Polarity: "Normal" or "Inverted"
Result Analysis	G.821 Analysis

Transmitter

➢ Synchronous Mode

General	Provided for all datacom interfaces
Clock Source	Internal synthesizer Datacom interface. May be inverted, Allowing selectable clock/data phase relationship X.21 operation limited as follows: DTE: datacom interface DCE: internal
Synthesizer Rates	1.2 Kb/s, 2.4 Kb/s, 4.8 Kb/s, 7.2 Kb/s, 9.6 Kb/s, 19.2 Kb/s, 38.4 Kb/s, N×64 Kb/s (N=1~32)
Synthesizer Accuracy	±30 ppm Ageing ±2 ppm per year typical
Interface Clock Source	Minimum rate: 50 bit/s Maximum rate: 2.048 Mb/s
Clock Output	Datacom interface. May be inverted, allowing selectable clock/data phase relationship. No clock output on X.21 interface when configured as DTE.

➢ Asynchronous Mode

General	Not provided for X.21 operation.
Rates	50 b/s, 75 b/s, 150 b/s, 300 b/s, 600 b/s, 1.2K b/s, 2.4 Kb/s, 4.8 Kb/s, 7.2 Kb/s, 9.6 Kb/s, 19.2 Kb/s.
Character Format	· Character length: 5, 6, 7 or 8 bits. · Parity: odd, even, 0, 1 or none. · Stop bits: 1 or 2 (character length 6, 7 or 8 bits); 1.5 (character length 5 bits).
Data Polarity	Normal or inverse polarity may be selected.
Error Add	Same as "E1". (Bit error only)

Receiver

➢ Synchronous Mode

Rates	Maximum rate 2.048 Mbit/s
Clock Sources	Datacom interface. Internal (DCE mode only). Data is clocked coincident with the transmitter output clock. Both sources may be inverted, allowing selectable clock/data phase relationship. X.21 operation limited as follows: DTE: datacom interface. DCE: internal.

➢ Asynchronous Mode

General	Not provided for X.21 operation.
Rates	As selected for transmitter.
Character Format	As selected for transmitter.
Data Polarity	Normal or inverse polarity may be selected.

"G.703 CO" Specifications (Option)

General

Measuring Interface	G.703 co-directional
Standard	G.703
Line Code	AMI
Test Pattern	Same as "E1"
Test Period	Manual, Auto, Timer
Result Analysis	G.821 Analysis
Physical Interface	DB44 (G.703 CO test cable)

Transmitter

Impedance	120 Ohm balanced (Nominal)
Pulse Shape	Conform to with ITU-T G.703 Table 1
Tx Clock Source	Internal, Interface (Loop timing)
Internal Tx Clock	· Frequency: 64 kHz · Stability: ± 30 ppm temperature 0~40□ · Ageing: ±2 ppm per year (typical)
Octet Timing	Comply with ITU-T G.703, can be disabled.
Error Add	Same as "E1"

Receiver

Rate	64 kbit/s ± 150 ppm (G.703 specs ± 100 ppm)
Input Impedance	120 Ohm balanced (Nominal)
Pulse Shape	Conforms to ITU-T G.703 Table 1
Interference	Typically meets G.703
Jitter Tolerance	Meets ITU-T G.823 Section 3
Alarm Detection	Signal Loss, Octet Loss

Other Specifications

Serial Port	RS-232 Baud Rate: 19.2 Kb/s Character Length: 8 bit Parity: None Stop Bits: 1 bit
Battery	5×1.2V AA NiMH rechargeable battery, GP180AAHC, 1800 mAH
AC Power Adapter	Input: AC 100V~240V ±10% 50/60 Hz 0.45A Output: DC12V/1.5A
Dimension	249mm×90/128mm×60mm (L×W×H)
Weight	760g
Operating Temperature	0~40℃
Storage Temperature	-30~+70℃
Humidity	5%~90% no condensation